

Daily GLOWBUGS

Digest: V1 #99

via AB4EL Web Digests @ SunSITE

Purpose: building and operating vacuum tube-based QRP rigs

[AB4EL Ham Radio Homepage @ SunSITE](#)

%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%% GlowBugs %%%%%

Subject: glowbugs V1 #99
glowbugs Thursday, August 28 1997 Volume 01 : Number 099

Date: Thu, 28 Aug 1997 06:08:21 -0400
From: "Brian Carling" <bry@mnsinc.com>
Subject: Re: Secret origins

Jeff I was curious about your work with the 12V tubes!

By the way the rest of the write-up/Intro was great too.

What numbers are those tubes? I would like to keep an eye out for some. Do you have to use low impedances for the coupling?

Bry, AF4K

*** 73 from Radio AF4K/G3XLQ Gaithersburg, MD USA *
** E-mail to: bry@mnsinc.com *
*** See the interesting ham radio resources at: *
** http://www.mnsinc.com/bry/ *

AM International #1024, TENTEN #13582. GRID FM19
Rigs: Valiant, DX-60/HG-10, Eldico TR-75, Millen 90810
FT-840, TM-261, Ameco TX-62, Gonset Communicator III
HTX-202...TEN-TEN #13582, DXCC #17,763 Bicentennial WAS

Date: Thu, 28 Aug 1997 06:08:23 -0400
From: "Brian Carling" <bry@mnsinc.com>
Subject: Re: My Intro and what I like to do. . .

It's interesting to see that there are still quite a few young people who are into the old radios.

I have a yong correspondent in Alabama (age 16) who really likes tubes and is learning about and building tube circuits too.

Bry

On 25 Aug 97 at 22:51, Adam McLaughlin wrote:

> Hi Fellow Glowbuggers!
>
> My name is Adam McLaughlin, and I am 17 years old. I am an Extra class ham,
> and I operate 100 % CW since I became a novice 5 years ago.
>
> My Current rigs are: Hallicrafters SX-25, SX-28A, S-38E, SX-42, S-72, SX-99,
> HT-37. Hammarlund HQ-100, HQ-170, HQ-180AXR. Heath TX-1 (2 of them!) SB-401,
> Complete SB-104A line (2 of them!) SB-220. Eico 720. National RAO-9/NC-127
> HRO-500. Knight R-100 (2 of them!) T-150A. SBE-34 too. I also collect
> console tube entertainment receivers, specifically the Victor line. My
> favorite in the 29K2. As you can see I am a receiver nut.
>
> I am looking for a Globe Chief.
>
> I am very glad to say that I don't own a microphone. I love to homebrew and
> I have made many QSK gadgets like QSK TR switches, crystal calibrators,
> timing and delay stuff for sequencing, and others. I love to operate crystal
> control and I enjoy it very much. As a matter of fact I have a shipment of

> 15 rocks coming in this week from a ham in pleasanton.
>
> I have a home brew antenna tuner and I am planning to build a home brew
> transmitter using a 6AG7 crystal oscillator and 813s pretty soon. I also
> have a transformer that puts out 900 Volts at 3/4 amp, so if anybody has an
> idea what to do with this let me know.
>
> I am still in High School, as I am planning to go into an electronics field
> when I graduate. My dream is to build the perfect HF tube receiver. Right now
> I earn radio money fixing other people's radios in any time period from the
> 1930s to the 1980s. I do a lot of heathkit stuff because these radios act up
> VERY frequently, especially the solid state stuff. (If I told you all of my
> SB-104 stories you would swear never to run anything silicon again!)

>
> I have been collecting parts for the past few years and I have a whole
> storage shed (12 by 14 feet) full of stuff! Lots of good stuff, lots of
> weird stuff. P.A. coils for a BC-610, "United Electron Tubes", etc. I keep
> telling the family it saves me money in purchasing, but I often have to run
> to the store to buy some part to make my weird stuff work together.

>
> I hope this is descriptive for my interests and activities!

>
> Very 73 and Happy Glowbugging,
>
> Adam
> Adam McLaughlin KD6POC
> QRG: 7037 Kcs & 7014 Kcs (DX Only)
> kd6poc@jps.net
> www.jps.net/jmclaugh
>
>
>

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Date: Thu, 28 Aug 1997 06:08:23 -0400
From: "Brian Carling" <bry@mnsinc.com>
Subject: Re: intro

C'mon Shane - "still no license" yet you run a 6L6 on 3579 kHz???

We gotta get you on the air with a real ticket, man!

Reminds me of when I first got here from Engalnd in 1968 and there
was NO "Reciprocal Permits" back then!

I had a Knight T-60 and an SX-99 but for the first few weeks I just
listened. Then after I got the hang of it with 40m CW, I just picked
me a call sign that sounded like the latest issued WN4 calls on the
air and fired up occasionally. Living in fear was not to last - I
soon had my call as G3XLQ/W4 thanks to a new rule by the FCC later on
in '68.

That T-60 had one amazing feature: If you transmitted on 10m with no
crystal in the socket, it would self-oscillate right in the 11m CB
band and I could contact neighborhood kids on their Channel 14
walkie-talkies, but they never found out who I was. He he he he he
he!

More later - gotta go.

Bry, AF4K

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Date: Thu, 28 Aug 1997 06:38:59 -0400
From: "Brian Carling" <bry@mnsinc.com>
Subject: INTRO - long

Hi everyone - my name is Brian Carling, AF4K
Formerly A4941 (SWL callsign 1964-68)
G3XLQ, G3XLQ/W4, WB4FPH 1975-78

Born in England 1950.

It all started in the late 60s with my Uncle Jack's tape recorder!
That thing just amazed me! Also we had various table-top radios back
in those days, and you could hear trawlers, police, maritime and
numbers signals on there back in those days.

My Uncle Jim gave Nanna a transistor radio (wooden case!) some time
along in there, and I spent many hours listening to and gazing at
that thing, the family crystal set, my older brother's record player
etc. Nanna even had a TV in her room - must have been a nine inch
screen. We used to watch the English wrestling on Saturday mornings
on it and then later in the day, "Saturday Night at the London
Palladium" - a big variety show like Ed Sullivan only much better!

There was no "pop music" station, so we listened to Radio Luxembourg
on the Medium Wave (AM) dial on 208 metres (we had no kilohertz on
the medium wave!) Every station was given in metres only.

As a small lad in the 1950s, I was surprised and delighted when after
eating dinner at Uncle Jack's house, he invited us all to sit down and
listen to what we had been saying BEFORE dinner. He had HIDDEN a
microphone behind a chair in the living room and taped us all. Me, my
brother, my parents and my grandmother! None of us had seen such a
machine before, but within a couple of years, my brother and I both
got one. His a 4-speed Philips, mine a BSR single speed cheaper one.

We had great fun with those, but I soon went on to make homemade
intercoms, amplifiers, switchboxes etc. I even built a LIGHT BULB
TESTER when I was about 11 years old and offered to test the
neighbours' light bulbs for them (for a fee) - RIGHT!

My brother played in rock/pop bands professionally from a young age so
I was always around amplifiers and other electrical things and helped
set the things up for them, as well as helping to build and wire
up/test their speaker cabinets etc.

It wasn't long before I learned about tubes and transistors and what
fun things you could do with each of them. I once bought some
CAPACITORS from a parts shop because I thought they would AMPLIFY a
signal! Nah! They were the old tubular WAX coated paper variety as I
remember they smelled funny. About 0.1 uF for the design to feed
headphones off a speaker output of a radio I think. You live and learn
eh?

Later, I found that a school chum lived a few streets over from a TV
repair place and we used to sift through their garbage after school.
Often there were complete "TELLYS" laying around by the dustbin, and
we would take tools and open them up, extracting ALL of the resistors,
tubes, caps, even transformers, and of course the speaker!

Later I used some of these parts to make intercoms and radios. What
fun, and all FREE! Kids at school used to make things, like.... Well,
I remember the electric shock thing. They got an old matchbox (the
large wooden kind) and mounted a small transformer in it, and had an
external 4.5 volt bicycle lamp battery underneath, and two tinfoil
contacts on top.

You persuaded some numbskull kid to put his fingers across the
contacts and then you flipped a wire together and apart on the
primary side of the transformer which of course induced a huge
transient voltage in the secondary and zapped the mug!

Another gadget someone built, that impressed me, was a 1 kHz
multivibrator that produced huge squarewaves using two transistors,
and the harmonics from it would jam ANY radio receiver within a few
feet. Great for annoying your school chums in the playground at
lunchtime. These things were all of course, entirely clandestine. If
the lads had been caught with such at school they would have been
punished I am sure!

Later on, G3WUW used to bring a single transistor phase shift osc. and some headphones to school , and would teach me the morse code on the steps during lunchtime. We later did some tube building together and I did most of the work to make a 6AG7 - 5B254M transmitter. We also fired up a WS19 set with 10 watts of awful sounding AM!! More later on this.

PART 2

SOME of my valve activities (that's tubes for you colonial types!) from those old days of my teenage years in England.

I saved a copy because I had promised some of the GLOWBUGS chaps here that I would eventually let you all read about the history too!

So here it is. Not much detail yet. Maybe I will edit it later and fill in the blanks as my memory gets jogged and I recall other bits and pieces, such as the 6J6 5 watt oscillator on 27 MHz RC band that I built, and the 38 sets that we put on the air on 7 Mhz talking between "James One" and "James Two" - and the paranoia upon seeing a GPO "Radio-detector van" prowling the neighbourhood after school one day (grin!) but that is another episode to come later...

= = = = =
My earliest memories include:

Around 1962 (at the age of about 11 or 12) I was living in the suburbs of Cambridge, and went to a boy scout "jumble sale" - just like a Flea Market in the USA. There I found for sale on one of the tables, a curious pair of valves. They were big, brand new RCA tubes in boxes with the number "805" on them. These things were big "bright emitter" bottles with huge, thick, carbon plate anodes. Now if I had known just what I had I would have guarded them with my life and put them to good use later! I have no idea where those valves wound up in the end. I probably traded them or sold them, but I DID have great fun lighting them up at home! I connected an old car battery to the filament connections and BINGO! Instant lighting for the room! I later found out that these were transmitting triodes good for about 300 watts each! I saw one the other day at a hamfest and ALMOST took it home!

In about 1964 we moved to the small, peaceful village of Cottenham, near Cambridge, and I remember going to visit the station of G3RFP, Fred who at that time worked in Technical Publications at Marshalls (where my dad was a draughtsman/design engineer) in Cambridge, England.

I lived in this small village, population 2400, about 8 miles N.E. of Cambridge.

I spent several Saturday mornings at Fred's house watching him run 10 watts of AM on Top Band with the local roundtable group. His transmitter had a large coupling coil to the end-fed half-wave antenna. It was about four inches in diameter with lots of turns. I became curious about all of the strange ham lingo! "QRM" - "QSB" - "73" - "5 and 9" etc. Fred's receiver was a Heathkit HR-10. Those old UK AM operators were very polite. They all acted like nobility on the air. It was grand. There were no such thing in those days as 2 meter repeaters, and SSB was just coming into its own on the HF bands.

I got to know the voices and callsigns of a number of local amateurs that way; the hams in Waterbeach, Cambridge, Newmarket and others in the villages around Cambridge. G5BQ, G3UUR, G2PU etc. etc.

My friend Allan at school later became G3WUW. He taught me the morse code with a one transistor phase shift oscillator on the steps of our school at the "County High School for Boys" as it was then, during lunch breaks etc.! He lived in OVER, and I lived in Cottenham. I made trips to his house in OVER on my bike, and also to Willingham to the SWL shack of my friend David Gyp.

Allan and I also built some equipment for the 6 MHz CCF Net in those days, (Combined Cadet Force) in conjunction with some pals at the Lys School in Cambridge, using things like 6AG7s and 807s. Our callsign was WHISKEY LIMA. Or was that the "CALLUP signal" used like a CQ to contact other stations? I forget! I can remember hearing him BELLOW "WHISKEY LIMA, SIGNALS!!" into a carbon microphone on the old 19 set at the County High School after school one day. With HT+ of about 800 volts on the anode of the poor old ceramic base 807 valve glowing red hot! Oh and the power was from a dynamotor! The homebrew 807 rig came later. I did most of the construction on the darn thing, and the best I remember it DID actually work. It used a 5B/254M which is a miniature 807 equivalent tube.

I went numerous times to the Cambridge and District Amateur Radio Club in those days also, and learned a great deal from the lectures there. That's where I met G5BQ and many other local hams. It was a LOT of fun. Also, the club had a nice Eddystone receiver that was ham bands only.

= = = = =

Additional notes:

MANY British amateur built their own equipment in those days or used military surplus. There was a LOT of that around in the 1960s still! And it was VERY cheap indeed. We used to go up to Tottenham Court Road in London where you found companies like PROOPS and "Z & I Aero Services" that were overflowing onto the streets with vast amounts of military surplus. QUITE inspiring to a lad!

A lot of the guys used SCR-522 rigs on 2 meter AM, or if they were wealthy, had a PYE business band radio converted to 2m AM. There was no commercial/public service FM on VHF in Britain in the 1960s that I am aware of - it was all AM, a wonderful mode if you like the sound of warm, hi-fi, audio!

Later around 1985 or so I got interested in AM again. Thanks to Roger Frith, N4IBF, who showed me his wonderful station consisting of a BC-610 / R-390A and 75A-4/ 32V-3 I was shown what AM could do! I soon acquired a Ranger, a Valiant and a Globe King 400. I never got the GK400 to settle down and stop self-oscillating in the V-70D triode finals so I never got it on the air! Wish I still had all three of those transmitters though! They sound great on the air.

When we moved from Tennessee to Maryland in 1987 I had to let go of a lot of my ham gear to move into a townhouse as I prepared to go to Bible College and change to a ministry career - something that never finally happened, but as they say: "That's a whole NUTHER story!"

I have now acquired a LABGEAR 160 TWIN transmitter. It uses an EL84 (6BQ5) modulated by an EL84 to produce 10 watts of AM on "Top Band." A great little Gem with built in VFO and it came with a 12V DC power supply for mobile use! This was built by Labgear BEFORE I even went to work for them (circa 1971)

I hope to write an article about this rig for Electric Radio next year. Thanks to G3UUR who brought it from England and his friend Peter who sold it to me!

Other present station goodies include:
Viking Valiant, AMECO TX-62, Gonset Comm III, SWAN 250, Homebrew 6AG7-6L6, DX-60 with HG-10B VFO, SB-10, 6C4-6AQ5 rig (Cake Pan CW-5), Cakepanion tube regen receiver (yet to be tried!), lots of tubes ready to make things with (grin) and a couple of sandstate rigs for HF and VHF.

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73 to all from Radio AF4K / G3XLQ in Gaithersburg, MD USA
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*** See the ham radio resources at:
<http://www.mnsinc.com/bry/>

Date: Thu, 28 Aug 1997 06:38:58 -0400
From: "Brian Carling" <bry@mnsinc.com>
Subject: Re: Intro

I like that call Jim, W4AOS = Aquisition Of Signal
(Term used on OSCAR!)

Bry

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Date: Thu, 28 Aug 97 07:59:03 EDT
From: jkh@lexis-nexis.com (John Heck)
Subject: Re: Permeability Tuned Receiver

Another "popular"(if not famous) permeability tuned radio of more modern vintage is the GE "Superadio" series.

>
> You could also learn about the ultimate permeability tuned receivers -
> the military R-390 family (R-388 to 392, some with A's) designed by
> Collins.
>
> Permeability tuning was also used for car radios, probably for small
> space and vibration considerations.
>
> Regards,
> Bill Hawkins
>

Date: Thu, 28 Aug 1997 10:39:26 -0400 (EDT)
From: leeboo@ct.net (Leon Wiltsey)
Subject: tubes

>To: gb
>From: leeboo@ct.net (Leon Wiltsey)
>Subject: tubes
>Cc:
>Bcc:
>X-Attachments:
>
>Hi Gang
>back from vacation.
>convinced old gent to lower prices further.(if he wanted to get rid of his
stock)
>So anybody wanting some tubes tv types or rec tubes, sweep types ect. ,
drop me an email
>with tubes needed. 73 73 73.
>
THANK THE LORD FOR ALL YOU HAVE

68 yr old semidisabled senior
(stroke got my balance & hand to eye coordination)
ham agn as KF4RCL TECK+ (MUCH HAPPINESS)
BUILD MOST STATION EQUIP
SUB.BA & GB-- NO SOLID STATE

LEON B WILTSEY (Lee) tel. 941 471 3739
4600 Lake Haven BLVD.
Sebring, Fl. 33872 (SEBRING) WHERE THERE IS NO QRM FROM THE LOCALS

Date: Thu, 28 Aug 1997 08:57:12 -0700 (MST)
From: Jeff Duntemann <jeffd@coriolis.com>
Subject: 12V "space charge" tubes (was Re: Secret origins)

Jim & everybody--

>> I am fascinated by the low-voltage 12V B+ tubes used briefly in car radios
>> in the late 50s.
>
>Wow...now that *does* sound interesting! Let me guess...there aren't any
>magazine articles or circuit diagrams on the web, or anything, describing
>ham equipment using these tubes...right? (We couldn't possibly get so
>lucky, I suppose.)

Well, we're not a LOT lucky, but we're a little lucky. There are a handful
of articles using these tubes in ham applications. Also, there is a car
radio circuit in back of one of the RCA receiving tube manuals; 1965 and
for a few years earlier, I think. That's where I got my IF strip. Works
great!

More important is an article from QST that describes a "mobile package"
using these tubes (sometimes called "space charge" tubes for reasons
obscure) that contains a front end, a switchable converter, and an 1600 kc
IF strip to be used in front of a car radio, making it double conversion on

all 5 bands. I'm going to use the converter portion in front of my IF strip when I get around to building it. (I'd build that strip but 1600 kc IF cans are unobtainium.)

Several converters have been published using 12V pentagrid tubes.

I have built an audio amp using 12V tubes that powers a small speaker and is deafening in phones.

There was a superregenerative receiver using a 12V tube published in PE or EI back in the sixties that I saw once but lost. Still looking for it. It covered the aviation band (108-118 Mhz, I think) but could be tweaked to 2M.

Some of the numbers that I recall off top of my head are the 12U5, 12K5, 12AD6, 12EK6, 12EA6. There were a bunch of them; I would guess 40 or 50 in the 1965 RCA tube handbook alone. They are dirt cheap, too, rarely more than a dollar or two apiece.

I have a folder of 12V tube info at home that I'll bring in and summarize here.

>Are any of these tubes even suitable for transmitting purposes?

At milliwatt levels, perhaps. I think the 12K5 can source 60 milliwatts--but my fear is that, having been designed for audio, the tubes capable of any kind of power, low that it is, would have very little gain at HF. It would be an interesting experiment for 160...or even 1750 meters, where you can't have more than a watt anyway.

>Makes me wish I had the knowledge necessary to design my own circuits..

Don't need too much of that. Crib a circuit from a magazine or tube handbook and then fool around. That's all I do. It's not magic--no worse math than square roots. There isn't much specific design advice on 12V tubes--I have two articles from the late Fifties that you might have to dig hard for--but the laws of physics don't change. You can work out the impedances and then do the usual.

I'd be VERY interested to hear what others have done with these tubes.

- --73--

- --Jeff Duntemann KG7JF
Scottsdale, Arizona

Date: Thu, 28 Aug 1997 09:17:01 -0700 (MST)
From: Jeff Duntemann <jeffd@coriolis.com>
Subject: Re: Secret origins

At 06:08 AM 8/28/97 -0400, Brian Carling wrote:
>Jeff I was curious about your work with the 12V tubes!

I'll post some stuff on it here soon; I don't have Net access from home and all my electronics stuff is back in the garage.

>What numbers are those tubes? I would like to keep an eye out for
>some.

12U5, 12K5, 12AD6, 12AE6, and probably 40 more. See the RCA tube handbooks from the early 60s for more. They're quite cheap, even from AES. I'll list some more tomorrow or as soon as I remember to bring in the folder.

>Do you have to use low impedances for the coupling?

Lower than with 180v on the plates, obviously, but because the plate currents are so small, it doesn't take Z down as much as you might think. The audio "power" amp I built inputs about 60mw (5 mils at 12V) so doing the math that gives you 2400 ohms, which is in the same ballpark as the "normal" audio amps I've built with 50L6s and so on. I found a small "transistor" transformer with a 2000 ohm primary that matched perfectly to 8 ohms.

It's fun--and you don't have to keep one hand in your pocket!

- --73--

- --Jeff Duntemann KG7JF
Scottsdale, Arizona

Date: Thu, 28 Aug 1997 09:34:13 -0700
From: "Ben Wallace" <bwallace@sd.cts.com>
Subject: Re: 12V "space charge" tubes (was Re: Secret origins)

The R-392 receiver used low voltage tubes. The R-392 receiver is powered by 24-28 vdc and uses low voltage B+ tubes exclusively. Interesting.

Ben
WB8HUR

- -----
> From: Jeff Duntemann <jeffd@coriolis.com>
> To: Jim Glover <psykey@okcforum.org>
> Cc: glowbugs@www.atl.org
> Subject: 12V "space charge" tubes (was Re: Secret origins)
> Date: Thursday, August 28, 1997 8:57 AM
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> Jim & everybody--
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>
> --73--
>
> --Jeff Duntemann KG7JF
> Scottsdale, Arizona
>
>
>

Date: Thu, 28 Aug 1997 13:47:37 -0400 (EDT)
From: rdkeys@csemail.cropski.ncsu.edu
Subject: Low Voltage Tubes

While we are on the topic of low voltage tubes..... most receiving tubes will run quite well at 24-36 volts on the plates. Many/most receivers will run quite well at that plate voltage if you set the series blocking resistors appropriately (drop them down from 10K to 500 or 1000 ohms max or just short them out). Audio power tubes are the oddball out, and some of the oscillator/converter tubes are a little weak at 24 volts, unless some care is taken. Remember that in the olden days 22.5 or 45 volts was common peanut whistle power. Many ran fine at 18 volts on the plates. More later, when I get my nose off the grindstone.....

73/ZUT DE NA4G/Bob UP

Date: Thu, 28 Aug 1997 13:54:23 EDT
From: kmlh@juno.com (kmlh @ juno.com)
Subject: kmlh: Re: Permeability Tuned Receiver

On Wed, 27 Aug 1997 09:42:02 -0500 (CDT) linscot@is.rice.edu (Steve Linscott) writes:
>>On Wed, 27 Aug 1997, Ben C Bradley wrote:
>>
>
>>
>>> Does anyone have any ideas for, or especially any info on,
>>> permeability-tuned receivers? The only one I've ever seen or heard
>>> of was a Heath FM-only tube broadcast radio. A schematic of an
>actual
>>> working one would be great. I don't know how well such a receiver
>>> would work, but I plan to build one regardless.
>
>
>I didn't see your original post, but the Collins R-390 family have to
>be
>the classic examples of permeability-tuned receivers.
>
>
73 de W5EGP

Collins 75A thru 75A4
All Collins S Line, KWM, etc
All Drake from the 1A on
All Collins 51J series
Central Electronics 100/200V
Auto radios from about 1941

There were others also. Many Collins type design PTO's show up at fleamarkets at real cheap prices and still NIB. Several MIL type receivers attributed to Collins were actually contracted to several companies so do not be alarmed if a strange name shows up on the PTO.

73....Carl KMLH

Date: Thu, 28 Aug 1997 13:54:23 EDT
From: kmlh@juno.com (kmlh @ juno.com)
Subject: Re: Secret origins)

On Thu, 28 Aug 1997 08:57:12 -0700 (MST) Jeff Duntemann

<jeffd@coriolis.com> writes:

>Jim & everybody--

>

>>> I am fascinated by the low-voltage 12V B+ tubes used briefly in car
>radios

>>> in the late 50s.

That is correct, they were primarily used in GM hybrid (SS AF output)
auto radios 1955-57. I can supply complete schematics to anyone for an
SASE.

There was also a thread on BA last year about using them in a regen.

>>

>>Wow...now that *does* sound interesting! Let me guess...there aren't
>any

>>magazine articles or circuit diagrams on the web, or anything,
>describing

>>ham equipment using these tubes...right? (We couldn't possibly get
>so

>>lucky, I suppose.)

>

>Well, we're not a LOT lucky, but we're a little lucky. There are a
>handful

>of articles using these tubes in ham applications. Also, there is a
>car

>radio circuit in back of one of the RCA receiving tube manuals; 1965
>and

>for a few years earlier, I think. That's where I got my IF strip.

>Works

>great!

>

>More important is an article from QST that describes a "mobile
>package"

Also in the old ARRL "Mobile Handbook".

>using these tubes (sometimes called "space charge" tubes for reasons
>obscure) that contains a front end, a switchable converter, and an

>1600 kc

>IF strip to be used in front of a car radio, making it double

>conversion on

>all 5 bands. I'm going to use the converter portion in front of my IF
>strip when I get around to building it. (I'd build that strip but

>1600 kc

>IF cans are unobtainium.)

>

>Several converters have been published using 12V pentagrid tubes.

>

>I have built an audio amp using 12V tubes that powers a small speaker

>and

>is deafening in phones.

>

>There was a superregenerative receiver using a 12V tube published in
>PE or

>EI back in the sixties that I saw once but lost. Still looking for

>it. It

>covered the aviation band (108-118 Mhz, I think) but could be tweaked
>to 2M.

>

>Some of the numbers that I recall off top of my head are the 12U5,

>12K5,

>12AD6, 12EK6, 12EA6. There were a bunch of them; I would guess 40 or
>50 in

>the 1965 RCA tube handbook alone. They are dirt cheap, too, rarely
>more

>than a dollar or two apiece.

>

>I have a folder of 12V tube info at home that I'll bring in and

>summarize

>here.

>

>>Are any of these tubes even suitable for transmitting purposes?

>

>At milliwatt levels, perhaps. I think the 12K5 can source 60

>milliwatts

40mw max per RCA manual, but this is Class A .

The 12AE7 dual triode has a plate dissipation of 1W so might hold some
promise.

The 12FK6 can run about 100mw input in Class A audio.

The 12U7 dual triode has promise also since it is rated up to 30v/15ma per section.

I do not remember any of this series used to directly drive a speaker; they were used as drivers to the SS output.

The radios themselves were very sensitive performers on the BC band and due to the small physical size I see no reason that many of the RF/IF tubes will not do a decent job on HF.

There was also a few military aircraft radios that used 24VDC tubes, but the models escape me right now. The 28D7 dual beam tetrode is one example.

73....Carl KMH

Date: Thu, 28 Aug 1997 18:07:34 +0000
From: Sandy W5TVW <ebjr@worldnet.att.net>
Subject: RE: 12v B+ tubes...

Hello gang,

Seems like the R-808/GRC-14 or whatever it was, used the same scheme. I think in this case it was 24 volts though. It's been too long since I saw one, but I think it used the Low voltage B+ scheme!

Wherever the set was....the one that winds its own coils with 'ribbon' wire in the transmitter.

73,
E. V. Sandy Blaize, W5TVW
"Boat Anchors collected, restored, repaired, traded and used!"
417 Ridgewood Drive,
Metairie, LA., 70001
ebjr@worldnet.att.net
Looking for: Hallicrafters SR-75 Transceiver
RK-34(VT-224) tubes, Butternut HF2V antenna*

Date: Thu, 28 Aug 1997 12:43:27 -0600 (MDT)
From: Shane <toyboat@freenet.edmonton.ab.ca>
Subject: Re: intro

On Thu, 28 Aug 1997, Brian Carling wrote:

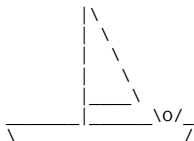
> C'mon Shane - "still no license" yet you run a 6L6 on 3579 kHz???

Only into a 15 Watt light bulb. Gets old fast :-).

> We gotta get you on the air with a real ticket, man!

Agreed. But "we" means "me" :-).

73
Shane Wilcox
VE6{I'm working on it! Honest!}



~~~~~  
Shane <toyboat@freenet.edmonton.ab.ca>  
~~~~~

Date: Thu, 28 Aug 1997 16:57:48 -0400
From: "Ornitz, Barry" <ornitz@eastman.com>
Subject: RE: HV Windings

Adam McLaughlin, KD6POC, asked the following question about power transformers: "How do you estimate the current rating?"

Unfortunately there is no simple answer. If you can measure the wire size on the secondary, you can use the values for circular mils per ampere quoted by Roy Morgan earlier. However, this is only a gross estimation for larger transformers. In small transformers, this ratio is quite different due to flux density considerations.

In potted transformers (like mil-spec versions), the volume of the transformer is approximately a linear function of the average volt-ampere rating. For transformers rated below about 500 VA, the slope is about 0.7 cubic inches total volume per total volt-ampere. Thus a 500 watt potted transformer is about 7"x7"x7" in size.

If you can measure the cross sectional area of the core, a much better relationship exists. This curve is published in many older ARRL Handbooks, but the following equation is easy with a modern calculator:

$$VA = 46.234 * (Area)^{1.3664}$$

where: VA = average or primary and secondary
 volt-ampere rating
 Area = cross sectional core area in
 square inches.
 ^ means raised to the power of...

This formula again works well up to around 500 volt-amperes or so.

Fred Terman in his "Radio Engineers Handbook" gives a formula which is somewhat simpler but not nearly as accurate. The proportionality constant he used is wrong, however. Using the same experimental data used to fit the above equation, I obtained the following equation in Terman's form:

$$VA = 17.601 * \text{SQRT}(Area) \quad \text{[same units]}$$

This formula predicts too low a rating for small transformers and too high a rating for larger ones.

>From a dimensional standpoint, if the exponent in the first equation were 1.5, the linear volume to power relationship would hold. Since smaller transformers have a bigger ratio of surface area to volume (better cooling) in non-potted form, the top equation has a somewhat different coefficient.

Note that these relationships give the average of the primary and the secondary volt-ampere rating of the transformer. This is not exactly power, however. With a choke input filter after a full-wave center-tapped rectifier (typical 5U4, 5Y3 arrangement), the primary and secondary volt-ampere ratings should be 1.1 and 1.57 times the power delivered to the load.

To estimate the HV rating a little better, you need to compensate for the filament windings. For a small transformer, a 5Y3 was typically used and a 5U4 for a bigger transformer. Thus the rectifier winding is around 10 to 15 VA. The 6.3 volt filament is anyone's guess but a reasonable figure is twice the rectifier filament winding. Subtract these from the total VA rating obtained from the core area and you have an approximation of the secondary VA rating.

But remember this is only an approximation. The real key is to see how warm the transformer gets during operation. Typical transformers are designed for a maximum 40 C (72 F) temperature rise. In typical use, the transformer should never rise above the point where you can still

touch it without being burned. This is a value of about 60 C or 140 F.

Use the transformer for about 10 minutes of typical operation based on the ratings estimated from the equations. Then if you can still touch the transformer without being burned, you are operating it within its ratings. If it is cool, you can push it some more, and if it is too hot, back off on the current draw.

73, Barry L. Ornitz WA4VZQ ornitz@tricon.net

>Dear fellow Glowbuggers,
>
>Does anybody out there have a suggestion for estimating the current carrying
>capacity of the HV winding of a power transformer?
>Adam McLaughlin KD6POC
>kd6poc@jps.net
>

End of glowbugs V1 #99

%%%% GlowBugs %%%% GlowBugs %%%% GlowBugs %%%% GlowBugs %%%%

[AB4EL Ham Radio Homepage @ SunSITE](#)

Created by **Steve Modena, AB4EL**
Comments and suggestions to **modena@SunSITE.unc.edu**
